EIC Detector-1 Simulation, Production, QA - Planning

Working Group: Exclusive/Diffractive

Please note this document is still being populated/live

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Synopsis

[Describe the main goals between now and CD-2/3a. Describe the overall strategy of your working group in its transition towards a single software stack.]

Since the studies from our working group can benchmark the performance of the evolving detector design particularly for the far forward and far backward systems, we plan to first develop analyses of a few golden channels that can be re-run whenever there is a new major geometry or detector update. For now, these channels will be:

- Pion Form Factor (DEMPgen generator, Fun-4-all framework)
- ep-DVCS (MILOU3D generator, Fun-4-all framework)
- ep-DVCS (EpIC generator, DD4HEP framework)
- Backward VM Production (eSTARLIGHT, DD4HEP framework)

Until the collaboration decides on a common framework, we will maintain the above channels in the framework in which they were originally developed for ECCE and ATHENA. Once a common framework is decided, we will begin the work of migrating to that framework.

Beyond these golden channels, we plan to

- Further advance the other studies from the ECCE and ATHENA proposals,
- Develop a number of additional studies, which time did not permit at the proposal stage, for example background processes
- Study the very challenging problem of the separation of incoherent background from coherent signal in a number of eA reactions, most prominently diffractive vector meson production.

Current requests

This section includes our requests for the next three months. For current status please see the entries with file locations listed in the following google sheet, please note the files for entries shaded in red are not ready yet (please do not use red shaded files):
https://docs.google.com/spreadsheets/d/1bLA2vD_0i0WO7niqDcIDtV4DOrjF3jxgQHSGLt0OmPQ/edit#gid=0

1. Coherent and Incoherent eA Diffraction with Sartre
   a. Total Events: 47 million
   b. Generator: Sartre
   c. Geometry to be simulated: Reference design plus all far-forward detectors
   d. Required reconstructed quantities: Central and forward tracks, forward photons
2. Incoherent Diffraction with BeAGLE

    a. Total Events: 20 million
    b. Generator: BeAGLE
    c. Geometry to be simulated: Reference design plus all far-forward detectors
    d. Required reconstructed quantities: Central and forward tracks, forward photons
3. DVCS with EpIC
    a. Total Events: 6 million
    b. Generator: EpIC
    c. Geometry to be simulated: Reference design plus all far-forward detectors
    d. Required reconstructed quantities: Central and forward tracks, central photons
4. DVCS with MILOU3D
    a. Total Events: 3 million
    b. Generator: EpIC
    c. Geometry to be simulated: Reference design plus all far-forward detectors
    d. Required reconstructed quantities: Central and forward tracks, central photons
5. Coherent Upsilon
    a. Total Events: 250 thousand
    b. Generator: eSTARLIGHT
    c. Geometry to be simulated: Reference design plus all far-forward detectors
    d. Required reconstructed quantities: Central and forward tracks
    e. Purpose is to study near-threshold production and to check separation of Upsilon peaks
6. Backward rho and omega production with eSTARlight
    a. Total Events: 200 thousand
    b. Generator: eSTARLIGHT
    c. Geometry to be simulated: Reference design plus all far-forward detectors
    d. Required reconstructed quantities: Central and forward tracks
    e. Purpose is to check reconstruction of backward rho and omega photoproduction
7. DVMP with IAger
    a. Total Events: 11 million
    b. Generator: IAger
    c. Geometry to be simulated: Reference design plus all far-forward detectors
    d. Required reconstructed quantities: Central and forward tracks, central and forward photons
8. DEMP with DEMPgen
    a. Total Events: 500 thousand
    b. Generator: DEMPgen
    c. Geometry to be simulated: Reference design plus all far-forward detectors
    d. Required reconstructed quantities: Central and forward tracks, forward photons

Future requests

This section includes anticipated requests for the next year. Please see the entries in red or topics without file locations at:
https://docs.google.com/spreadsheets/d/1bLA2vD_0i0WO7niqDcIDtV4DOrjF3jxgQHSGLt0OmPQ/edit#gid=0

1. Meson Structure Function Study with EIC_mesonMC
2. Additional Settings, Kaon FF with DEMPgen
3. Time-like Compton Scattering with EpIC
4. eA DVCS with TOPEG